V

THE SYSTEM OF GLOBULAR CLUSTERS

THE diameter of the Milky Way is certainly not less than a hundred thousand light years. It may be, and probably is, much larger. Undoubtedly the globular star clusters, which are observed along the borders of the Milky Way and sparingly in high galactic latitudes, form a system that extends throughout a region more than two hundred and fifty thousand light years in diameter.

The galactic system may be coextensive with the globular clusters; or it may be that the clusters, the star clouds of the Milky Way, and the local system surrounding the Sun form a complex system of higher order than a simple galaxy. We shall in time know about these matters; for the present we shall consider that the supersystem of a hundred globular clusters constitutes the fifth stage in our explorations and marks the point where we pass from considering various parts of the galactic system to the treatment of external galaxies.

The problems of star clusters have been presented fully in a recent Harvard publication[1] and further concentrated study of the clusters awaits the 60-inch reflecting telescope at the Bloemfontein station of the Observatory. Two current investigations, however, should be mentioned.

1. Most of the Cepheid variables in globular clusters have been found to have periods of less than a day and contribute little to our knowledge of the course of the

[1] Harv. Mon. No. 2, 1930.

period-luminosity curves. But there are a few classical Cepheids (with periods greater than a day), and Mrs. Hogg has completed as thorough a study of them as is possible with existing photographs. In addition to tests of the period-luminosity relation in globular clusters, she has determined the periods and average median magnitudes of many cluster type Cepheids in two bright globular clusters hitherto unstudied—Messier 4 and N. G. C. 362.

2. Most globular clusters look alike at the first glance, being radially symmetrical swarms of stars highly concentrated. But on close analysis differences and irregularities are found, and Mr. Miller has been making contour maps of the luminosity distribution in some of the bright northern globular clusters, basing his work chiefly on star counts for photographs of different exposure lengths.

Much remains to be done on the system of globular clusters, though we probably know this territory better than any of the other seven that concern us in our galactic explorations. We should like to examine further the individual stars in the clusters, photometrically and spectroscopically —for light variations and for motions. In particular we must work to find the link, if any, between the typical globular cluster and the open galactic clusters, or between the globular systems and the smaller spheroidal nebulae that are placed, with the spiral nebulae, in the category of external galaxies.

The relationship of globular clusters to other stellar organizations may be most easily elucidated by the study of those in the Magellanic Clouds, which are the nearest of the outside galaxies and the objects towards which our explorations now lead.